Treatment of clinically evident skeletal mandibular asymmetry

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ABSTRACT

Background: Orthodontists are frequently called upon to treat conditions in which there is asymmetry, either dentally, skeletally, or dentoskeletally, between the patients' right and left sides. Such asymmetries exist in all degrees of severity. It is well known that correction of dental and functional asymmetries can be accomplished with orthodontic treatment only whereas skeletal asymmetries are considered to present difficult orthodontic treatment problems and require orthopedic treatment and/or surgical intervention. The aim of this study was to assess the extent to which combined orthodontic and surgical treatment are applied to treat patients with mandibular asymmetry.

Materials and methods: The sample of this study consisted of 33 patients with different skeletal clinically evident mandibular asymmetry conditions. Comprehensive examination protocol was established for each patient and the deformity of mandibular asymmetry had been classified according to Henderson (1985) and James (1990) into 6 different conditions. Then the treatment has been determined according to each individual case following the policy of each of the operators in the different hospitals from which the sample had been collected.

Results: The treatment of mandibular asymmetry conditions was found to be mostly achieved by surgical intervention with or without orthodontic treatment.

Conclusion: The importance of the teamwork for the treatment of the candidates for orthognathic surgery was found to be realized by the operators in the different hospitals from which the sample had been collected but it needs to be emphasized and reinforced to be a well-established policy for the treatment of such cases.

Keywords: Mandible, asymmetry, orthognathic surgery.

INTRODUCTION

It is well known that correction of dental and functional asymmetries can be accomplished with orthodontic treatment only whereas skeletal asymmetries are considered to present difficult orthodontic treatment problems and require orthopedic treatment and/or surgical intervention (1-4).

With the advent of orthognathic surgery, the orthodontist’s role in diagnosis and treatment planning of cases involving skeletal disharmony has expanded greatly. Since contemporary surgical procedures can alter the bones relationship of the craniofacial complex, it is important that the orthodontist accurately assess the degree to which skeletal disharmony contributes to a given malocclusion before he/she formulates treatment objectives. Thus, close cooperation between the orthodontist and the oral and maxillofacial surgeon is needed (5,6).

MATERIALS & METHODS

From the information elicited from the patient's history and clinical examination aided by orthodontic and surgical records, the diagnosis has been established for each of the 33 patient with skeletal clinically evident mandibular asymmetry, and according to Henderson (1985) (7) and James (1990) (8), the asymmetric mandibular condition for each patient had been classified.

Then treatment has been determined according to each individual case following the policy of each of the operators in the different hospitals from which the sample had been collected as follows:

RESULTS

Table 1 shows counts and percentages for each condition with the treatment method, for the treatment method with each condition, and for the total.

As the table shows that 20 patients out of 33 have been operated upon and only one patient out of 33 had been followed up. Orthodontic treatment alone constitutes 4.8%, while surgical treatment alone constitutes...
61.9%. Combination treatment on the other hand, had been performed for 19.1% of the patients: 4.8% with presurgical orthodontics and 14.3% with postsurgical orthodontics. For 9.5% of the operated upon patients with presurgical orthodontics, it was decided to perform surgical intervention after the completion of their orthodontic phase of treatment. In only 4.8%, the treatment was postponed and follow up was indicated. Table 2 shows the methods applied for treatment of mandibular asymmetry and it is quite obvious that the females 12 patients were more willing to seek treatment than the male 8 patients.

DISCUSSION

In this study, 20 patients out of 33 with mandibular asymmetry have been operated upon. As table 1 shows orthodontic treatment alone had been performed for 4.8% of the cases. This case was a mild form of HME and orthodontic treatment alone in form of upper and lower fixed appliances were satisfactory for the patient’s needs.

Presurgical orthodontic treatment as a preparatory phase prior to the surgical intervention had been performed for 9.5% of the patients. Those patients had severe constricted maxilla with complete crossbite and upper and lower dental crowding, so presurgical orthodontics in the form of upper and lower fixed appliances were indicated to expand the upper arch and to remove dental compensations and crowding before surgery, which will be performed for those patients after the completion of the orthodontic phase of treatment.

Surgical intervention had been performed for 61.9% of the patients without presurgical orthodontic treatment but postsurgical orthodontics might be performed later on for those patients. The allowed research period precludes the follow up of the patients to the end of the treatment; however, this study found that some of the patients would be encouraged to continue their treatment with orthodontic appliances after performing the surgical intervention.

In 19.1% of the cases, combination of orthodontic and surgical treatment had been performed: 4.8% with presurgical orthodontics and 14.3% with postsurgical orthodontics.

It is clear that surgical intervention had been performed in approximately all the patients. It is well known that skeletal asymmetries are not corrected orthodontically but rather surgery is employed because orthodontic treatment may align the teeth, but it will not straighten the face. Furthermore, stability, periodontal health and facial balance are optimized when dental midlines shifts that result from skeletal deviation are treated with surgical, rather than orthodontic, tooth movement. Attempts to orthodontically correct the bite when the etiology is skeletal can produce buccal plate violation and gingival recession.

When table 2 is reviewed, it can be noticed that a variety of surgical techniques for the treatment of mandibular asymmetry had been performed. In some cases, the surgical procedure did not involve the mandible only, but bimaxillary surgical correction has been required. This was done in cases when the mandibular asymmetry was just one component of existing deformities that may present, or when the occlusal plane was significantly canted especially in cases with craniofacial microsomia and early ankylosis; nevertheless many patients were treated by mandibular surgery only and the net result had been a high degree of patient satisfaction.

Treatment of mandibular asymmetry by a variety of surgical procedures have been documented and established extensively in the literature. Nevertheless, to achieve the morphological and functional requirements of the treatment, mandibular asymmetry is best managed by a team: the dentist, the orthodontist, and the oral and maxillofacial surgeon. However, in this study it was found that the orthodontic treatment was to be implicated mostly in cases with severe malocclusion so presurgical orthodontics was indicated to remove the dental compensations and to align the teeth within each arch before surgery.

In this study, 1 case out of 33 patients presented with a history of late onset of HME (the onset was after 20 years). Suspicion of persistent active growth of the condyle on the affected side made the treatment to be postponed and the case was indicated for follow up for 6 to 12 months to ensure cessation of the abnormal growth before establishment of treatment; this was done in order to prevent relapse, the most problematic postoperative issue. The follow up is achieved by taking history and full records (panoramic radiograph, lateral and posteroanterior orthodontics, Pedodontics and Preventive Dentistry 84
There is a great deal of literature referring to condylectomy or high condylar shave for treatment of CH; it was frequently used by many authors (7,17,23-27). Concerning this point, treatment of CH; it was frequently used by to condylectomy or high condylar shave for technique.

In the literature (8, 16, 18-22) there is a profound emphasis on what is considered as a more definitive evaluation for the presence or absence of abnormal condylar growth, this is technetium 99 bones scanning. However this method is not applied in the diagnosis of the presence or absence of abnormal growth in cases with mandibular asymmetry in the hospitals from which the sample had been collected because it is considered invasive technique.

There is a great deal of literature referring to condylectomy or high condylar shave for treatment of CH; it was frequently used by many authors (7,17,23-27). Concerning this point, the surgeons in the hospitals from which the sample had been collected follow two treatment options; the first one is to postpone surgery until growth is complete, but the patient may suffer during this period from functional, esthetic and psychological problems. In this study, this was indicated only for 1 case out of 33 patients as previously mentioned. The second option is to perform condylectomy or high condylar shave for the abnormally active condyle combined with orthognathic surgery for correction of the secondary deformity, if present, at the same time as one-stage operation or later on as two-stage operation. In this study, this was not applied for any patient as all the cases (except the case that discussed above) were presented with the abnormal condylar growth had been already settled down.

In this study, it is obvious that the treatment plan in applying orthodontics and surgical procedures for those patients with facial asymmetry due to a growth disturbance in the mandible depends to a great extent upon: First: the nature of the deformity.
Second: the patient needs.
Third: clinical judgment and the experience of the operator.

In addition, it is clear that the cooperation between the orthodontist and the surgeon is present but not to the optimal level, especially in the hospitals that have not been provided with orthodontists and orthodontic facilities. Therefore, sometimes the surgeon was reluctant to refer the patient for the orthodontic consultation and treatment before and/or after surgery. On the other hand, it is important for the orthodontist also not to be reluctant to refer such cases for the surgical consultation and treatment for the reasons explained above.

Treatment of mandibular asymmetry by a team needs not to be overemphasized and therefore, it is important to reinforce this cooperation and to provide each consultant clinic of oral and maxillofacial surgery with orthodontist to work hand by hand with the surgeon in planning for the treatment of the candidates for orthognathic surgery.

REFERENCES
17. Secchi A, Vanarsdall R. Efficacy of high


Table 1: Cross tabulation of the conditions with the methods of treatment (descriptive statistics).

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### Table 2: Methods of treatment.

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<th>Case No</th>
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<td>3</td>
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<td>F / 21</td>
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<td>Upper and lower fixed appliances.</td>
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| 5       | UTMJA     | F / 20   | a. Anterior subapical maxillary osteotomy with extraction of 4 4 (set-back & upward movement).  
           b. Centralizing sliding genioplasty / Splint. | None |
| 6       | HME       | F / 20   | Body ostectomy with extraction of 4 / Splint. | Postsurgical upper & lower fixed appliances. |
| 7       | HME       | F / 19   | Body ostectomy with extraction of 4 / Splint. | Postsurgical upper & lower fixed appliances. |
| 10      | AMP †     | F / 31   | Bilateral sagittal split osteotomy (set-back)/IMF. | Postsurgical upper & lower fixed appliances. |
| 11      | UTMJA     | M / 16   | a. Resection of ankylosis segment.  
           b. Ipsilateral coronidotomy.  
           c. Early mobilization & physiotherapy. | None |
| 12      | AMP †     | M / 22   | a. Bilateral sagittal split osteotomy (set-back and rotation).  
           b. Genioplasty (reduction & backward movement).  
           c. Le fort I osteotomy (upward movement) with bone graft / IMF. | None |
| 14      | HME       | F / 19   | a. Maxillary bilateral posterior segmental osteotomy with extraction of 4 (upward movement).  
           b. Bilateral sagittal split osteotomy (set-back & rotation) / IMF. | None |
| 16      | AMP †     | M / 21   | Köle procedure / Splint. | None |
| 18      | HME       | F / 19   | Body ostectomy with extraction of 4 / IMF. | None |
| 19      | AMP †     | F / 20   | Body ostectomy with extraction of 4 / Splint. | None |
| 22      | UCFM      | F / 28   | a. Le fort I osteotomy to correct canting.  
           b. Bilateral sagittal split osteotomy / IMF. | None |
| 24      | AMP †     | M / 16   | None               | Upper & lower fixed appliances with extraction of 4/4 & expansion for upper arch. |
| 26      | AMP †     | M / 17   | None               | Upper & lower fixed appliances with extraction of 4 & expansion for the upper arch. |
| 27      | AMP †     | M / 25   | Body ostectomy with extraction of 4 / Splint. | None |
| 29      | HMH       | F / 22   | Lower border surgery. | None |
| 30      | UCFM      | F / 22   | a. Le fort I osteotomy (to correct canting).  
           b. Unilateral sagittal split osteotomy (Rt side), inverted L osteotomy (Lt side) with bone graft / IMF. | None |
| 31      | HMH       | M / 27   | Lower border resection. | None |
| 33      | HME       | M / 20   | a. Le fort I osteotomy (upward movement) with extraction of 4 & anterior segmental maxillary osteotomy (set-back).  
           b. Genioplasty (reduction & forward movement).  
           c. Bilateral sagittal split osteotomy (set-back and rotation) / IMF. | None |
Figure 1: Percentage distribution of the methods of treatment through the mandibular asymmetry conditions.

Figure 2: Condylar hyperplasia (Hemimandibular Elongation Rt side)  
(A & C): Preoperative (B & D): Correction by body ostectomy on Rt side  